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The water quality standards program surveys standards for the first nationwide strategy for water quality management. It contains four major elements: the use (recreation, drinking water, fish and wildlife propagation, industrial, or agricultural) to be made of the interstate water; criteria to protect those uses; implementation plans (for needed industrial-municipal waste treatment improvements) and enforcement plans; and an antidegradation statement to protect existing high quality waters. Disinfection is employed to protect public water supplies, primary- and secondary-body-contact recreational waters, shellfisheries and agricultural waters for domestic animals.

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ENVIRONMENTAL PROTECTION AGENCY
Office of Water Programs

DISINFECTION

Division of Water Quality Standards
Washington, D. C.
May 1971

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The water quality standards program is directed by the Environmental Protection Agency, an independent regulatory agency which has responsibility for approving State-adopted standards, evaluating adherence to the standards, and overseeing enforcement of standards compliance.

Standards, the first nationwide strategy for water quality management, contain four major elements: the use (recreation, drinking water, fish and wildlife propagation, industrial, or agricultural) to be made of the interstate water; criteria to protect those uses; implementation plans (for needed industrial-municipal waste treatment improvements) and enforcement plans; and an antidegradation statement to protect existing high quality waters.

Minimum water quality criteria, or numerical specifications of physical, chemical, temperature, and biological levels, are stated in the National Technical Advisory Committee report to the Secretary of the Interior, Water Quality Criteria, dated April 1, 1968, and published by the Government Printing Office, Washington, D. C. Unavailability of the NTAC report before June 30, 1967--the date set by the Water Quality Act of 1965 for formal adoption of State standards--resulted in significant variations between the State-adopted and the NTAC minimum criteria. Some standards were adopted and approved before the NTAC report became available.

The Water Quality Criteria report is presently being updated in light of new scientific and technical information, with schedule publication in June 1972. These criteria compilations are issued to provide information to the public on water quality standards. As further information becomes available, they will be updated.

Water quality standards are subject to change when justified by newly available technical and scientific information. For the latest information refer to the existing approved water quality standards which can be obtained from the individual State water pollution control agency or EPA regional office.

Disinfection is employed to protect public water supplies, primary- and secondary-body-contact recreational waters, shellfisheries (because oysters, clams, and mussels can accumulate microorganisms, including bacteria and viruses, and transmit them to consumers), and agricultural waters for domestic animals. Disinfection reduces the water-borne coliforms--organisms existing in feces, and other sources, used as indicators of pathogen content of the disease-producing potential of water. Inadequately disinfected sewage can contaminate receiving waters with Salmonella, Shigella, Escherichia coli, Leptospira, and Mycobacterium. Enteric viruses such as polio and hepatitis can also be present.

Individual State-adopted standards follow.

May 1971

WATER QUALITY STANDARDS SUMMARY

DISINFECTION-1

Alabama - "All sewage discharged to waters of the State used as sources of public water supply, used for the harvesting of oysters or customarily used by the public for swimming and other whole body water-contact activities shall receive a minimum of secondary treatment and, if necessary, disinfection."

Alaska - Disinfection required where necessary.

Arizona - Chlorination is required when wastes contain pathogenic organisms.

Arkansas - No specific requirement found in standards*

California - North Coastal streams only - Treated wastes which may indirectly enter a North Coastal stream must be disinfected so as to contain not more than a median MPN of 50/100 ml total coliform.

Colorado - "All wastes capable of treatment or control prior to discharge into any waters of the State, shall receive secondary treatment with disinfection or its industrial waste equivalent, as determined by the State Water Pollution Control Commission."

Connecticut - All sewage treatment plant effluents must be disinfected before discharged to any of the State's inland or coastal waters.

Delaware - "All wastes (exclusive of storm water bypass) containing human excreta or disease producing organisms shall be chlorinated."

Florida - (No requirement found in standards.)

Georgia - Secondary treatment or the equivalent with disinfection is a basic requirement for all wastes discharged to Georgia waters.

Hawaii - (No requirements found in standards.)

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* The State Water Pollution Control Commission has the authority to require whatever treatment is necessary including disinfection of effluents.

Idaho - Communities and industries . . . having primary treatment no current waste treatment needs will be required to provide secondary treatment or its equivalent . . . . Secondary treatment with disinfection or the equivalent will be required for all new domestic waste discharges.

Illinois - Disinfection with up to 1 mg/l of chlorine residual in the effluent to reduce coliform 5000 or less, where necessary (is required) . . . (least stringent criteria - most regulations have stricter requirements). Teritary or other advance treatment or modifications of conventional treatment will be specified for all intermittent streams and small or low flow streams and shall include effluent disinfection at least through the statements in "Technical Release 20-22," April 1, 1967.)

Indiana - Continuous disinfection is to be provided throughout the year for all municipal wastewater treatment plant effluent in the Lake Michigan Basin. "The Indiana implementation plan shows disinfection specified for most sewage effluents."

Iowa - "Where a significant coliform or other bacterial increase in a designed Recreation Use Area can be identified with a controllable waste discharge, chlorination or other control procedures to reduce the bacterial concentration below the guide limits may be required."

Kansas - "All treated wastes discharged to ephemeral streams which flow through populated areas or are discharged in the vicinity of body contact recreational areas must be chlorinated . . . ."

Kentucky - Specific treatment requirements are not included in Kentucky Standards.*

Louisiana - (No requirements found in standards.)

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* The State Water Pollution Control Commission has the authority to require whatever treatment is necessary including disinfection of effluents.

Maine - "Effluent disinfection will be required on a year-round basis for all effluent from sewage treatment plants as well as any other waste treatment plant effluent containing fecal material or other substances which without adequate disinfection would be inimical to the public health. Such disinfection will be required for all classes of water."

Maryland - (No requirement found in standards.)

Massachusetts- Freshwater -- "All wastes shall receive appropriate waste treatment which is defined as secondary treatment with disinfection or its industrial waste treatment equivalent except when a higher degree of treatment is required to meet the objectives of the water quality standards, all as determined by the Division of Water Pollution Control. Disinfection from October 1 to May 1 may be discontinued at the discretion of the Division of Water Pollution Control."

Coastal or Marine Waters -- "Appropriate treatment is defined as the degree of treatment with disinfection required for the receiving waters to meet their assigned State or interstate classification and to meet the objectives of the water quality standards. Disinfection from October 1 to May 1 may be discontinued at the discretion of the Division of Water Pollution Control."

Freshwater and Coastal or Marine Waters -- "The amount of disinfection required shall be equivalent to a free and combined chlorine residual of at least 1.0 mg/l after 15 minutes contact time during peak hourly flow or maximum rate of pumpage."

Michigan - "Year around disinfection of all final effluents from sewage treatment plants is required."

Minnesota - "No treated sewage, or industrial waste or other wastes containing viable pathogenic organisms, shall be discharged into interstate waters of the State without effective disinfection. Effective disinfection of any discharges, including combined flows of sewage and storm water, may be required where necessary to protect the specified uses of the interstate waters."

Mississippi - (No requirement found in standards.)

Missouri - (No requirement found in standards.)

Montana - The minimum treatment requirement for domestic sewage discharged to the Missouri and Mississippi Rivers drainages is . . . . "Primary treatment and disinfection."

Nebraska - (No requirement found in standards.)

Nevada - (No requirement found in standards.)

New Hampshire- Section 311:3:1 of Chapter 311 Laws of 1967 states: "Insofar as practicable, the initial objective of the control program will be to obtain the installation of primary treatment (with adequate disinfection where sewage discharges are involved) for all discharges of sewage and industrial wastes."

New Jersey - "Year-round effective disinfection is an accepted method of treatment required in New Jersey for most domestic wastes and other wastewaters. Effective disinfection is hereby defined as:

(a) One (1) mg/l combined chlorine residual after a thrity (30) minute contact period based on design flow or a twenty (20) minute contact period during peak hourly flow or maximum rate of pumping.

(b) Coliform organisms not to exceed an MPN of 240 per 100 milliliters.

New Mexico - (No requirement found in standards.)

New York - Continuous year-round disinfection of sewage treatment plant effluents.

North Carolina-(No requirement found in standards.)

North Dakota - Effective disinfection of any treated discharges, whether sewage, industrial wastes, or other wastes, or overflow discharges from combined storm water and sanitary discharge, if such discharges constitute a potential or actual interference with the intended usage of the waters of the Red River of the North, the Boise de Sioux, and parts of the Sheyenne and Pembina Rivers may be required by the State Health Department. Disinfection was not mentioned in standards for other interstate waters.

Ohio - Secondary treatment and disinfection is required for effluents discharged to the Ohio River. Disinfection that will maintain coliform concentrations below 5,000 organisms per 100 ml at public water supply intakes, and not to exceed 1,000 organisms per 100 ml where and when the receiving waters in proximity to the discharge point are used for recreational purposes are required for the interstate waters of Lake Erie. All effluents discharged to the Great Miami, Whitewater, and Wabash River Basins will be satisfactorily disinfected to meet the criteria for downstream water uses.

All sewage effluents discharged to the Mahoning River, Pymatuning and Yankee Creeks, and Little Beaver Creek will be satisfactorily disinfected to meet the stream-water quality criteria. All municipal sewage effluents discharged to the Maumee, Tiffin, St. Joseph, and St. Marys River Basins will be disinfected in a manner that will maintain coliform concentrations not to exceed 5,000 organisms per 100 ml at public water supply intakes, and not to exceed 1,000 per 100 ml where and when the receiving waters in proximity to the discharge point are used for recreational purposes involving bodily contact. Municipal sewage treatment plant effluents discharged to the Ashtabula River, Conneaut Creek, and Turkey Creek including interstate waters of Ohio and Pennsylvania will be disinfected in a manner that will maintain coliform concentrations not to exceed 5,000 organisms per 100 ml at public water supply intakes, and not to exceed 1,000 organisms per 100 ml where and when the receiving waters in proximity to the discharge point are used for recreational purposes involving bodily contact.

Oklahoma - All interstate rivers and tributaries of same have the following requirement: " . . . Waste discharges into waters used or capable of being used for domestic water supplies or body contact aquatic sports including skiing and swimming, shall receive disinfection or equivalent treatment as necessary. . . ."

Oregon - All sewage shall receive a minimum of secondary treatment or equivalent (equal to at least 85% removal of 5-day biochemical oxygen demand and suspended solids) and shall be effectively disinfected before being discharged into any public waters of the State.

Pennsylvania - "Effective disinfection to control disease producing organisms shall be the production of an effluent which will contain . . ." included as part of definition of secondary treatment.

Rhode Island - "All effluents from domestic wastes treatment plants and industrial waste treatment plants accepting domestic wastes, are and will be chlorinated at all times before their discharge to a water course."

South Carolina - (No requirement found in standards.)

South Dakota - Effective disinfection of any wastewater discharges, including sewage, industrial wastes, other wastes and overflows from combined storm and sanitary sewer systems, if these discharges constitute an actual or potential interference with the intended beneficial uses of these waters, may be required by the (South Dakota) Committee (on Water Pollution).

Tennessee - (No requirement found in standards.)

Texas - It is the policy of the State of Texas, acting through the Texas Water Quality Board, to require primary and secondary treatment and disinfection (except for oxidation pond effluents) at all facilities serving the general public and which treat domestic sanitary wastes.

Utah - While the standards described apply generally to receiving stream flow, they can and must become effluent standards as required by lack of dilution water. Furthermore, because of the public health ramifications of the standard for coliform bacteria, it is presently an effluent standard by reason of the requirements stated in Section I-9 b, Exhibit 5, which limits coliforms to 5,000/100 ml. in any discharges not isolated from the public. This requirement is given additional force by Section III-82 b, Exhibit 5, which recognizes the limited ability of chemical disinfectants, especially chlorine, to kill bacteria which are protected by layers of organic substance, through a requirement for certain biological oxidation treatment prior to final disinfection."

Utah (Cont'd)- Part III-82 of the Utah State Department of Health Code of Waste Disposal Regulations explain their chlorination requirements which are:

(a) Treatment works effluents shall be chlorinated for reduction of bacteria and viruses as required by final conditions of disposal and as stipulated by the Boards.

(b) In general, chlorination will be considered fully effective for the purposes of these regulations when applied to oxidized effluents retaining not more than 25 percent of the raw wastewater BOD and containing not more than 50 mg/l of BOD and not more than 50 mg/l of suspended solids.

(c) . . . "For disinfection, the capacity should be adequate to produce a residual of 1.0 mg/l in the final effluent. . ."

Vermont - "Appropriate treatment shall be defined as secondary treatment with disinfection or its industrial waste equivalent as determined by the signatory State regulatory agency. Lesser degrees of treatment or control will be permitted only where it can be demonstrated that attainment of the specified water use class criteria of quality can be effectuated."

Virginia - Minute 59 states: "Chlorination facilities are to be operated continuously during the entire year and a chlorine residual of at lease 2.0 ppm shall be maintained at all times . . . at sewage treatment facilities that discharge effluent to Williams and Upper Machodoc Creeks, King George County."

The Board requires that all treated discharges to the Nansemond River (Suffolk area and Shingle Creek) ". . . containing bacteria shall be chlorinated sufficiently and continuously (100% of the time) to maintain a residual which will insure substantially complete removal of coliform organisms. This action is to be instituted immediately by all concerned owners."

Although disinfection is not specifically required for all State interstate waters, the Board has the necessary authority to require it in specific instances as they deem necessary.

Washington - Existing and new domestic waste dischargers shall provide adequate secondary sewage treatment, disinfection and outfall facilities. Where existing and new commercial, industrial or domestic wastes discharge to salt water, secondary treatment shall be required unless, after a review of existing data or an engineering study, it can be demonstrated that a lesser degree of treatment will provide for protection of present and future water uses and the preservation or enhancement of existing water quality. In no case, however, will less than primary treatment with disinfection and adequate outfall be accepted.

West Virginia- "Chlorination will be required for all installations and will be employed for twelve months of the year."

Wisconsin - Disinfection of sewage effluents is necessary for a fuller use of our surface waters and in the protection of public health. Disinfection is to be used during the May 1, through October 31 period annually where recreational use is involved. The department will require year around disinfection where public water supplies are involved.

Wyoming - Required at sites determined by studies.

District of Columbia - Although disinfection is not specifically mentioned as a requirement in the adopted water quality standards as submitted and approved by the Secretary of the Interior, later enforcement conferences have required it as a policy.

Virgin Islands - Although disinfection is not specifically noted as a requirement in the water quality standards, the power of the Commissioner of Health to make it one is clearly indicated under the section titled "Implementation and Enforcement Plan."

Guam - No specific requirement found in standards.

Puerto Rico - "Chlorination of treatment plant effluent will be required in those cases in which it is necessary to maintain the receiving body of water within the specified quality for its use."